PHYSICS
CURRICULUM

Unit-1

Electric Charge & Electric Field

- Electric Charge
- Quantization of Electric Charge
- Conservation of Electric Charge
- Charging by Induction
- Coulomb's Law
- Superposition Principle
- Electric Field.
- Electric field due to point charge
- Electric dipole and its Electric feild
- Electric dipole in a uniform electric field and non uniform field
- Continuous distribution of charges
- Electric field lines and its characteristics
- Electric flux
- Guass's law and its applications

Unit-2

electrostatic potential & capacitance

- Electrostatic potential
- Electrostatic potential energy
- Electric potential due to point charge
- Electric potential due to and electric dipole
- Electric Potential due to system of charges
- Equipotential surface
- Relation between the electric field and the electric potential.
- Potential Energy of a system of point charges
- Potential Energy of an electric dipole in an external electric field
- Electrostatics of conductors
- Capacitor and capacitance
- Parallel plate capacitor
- Combination of capacitors
- Energy stored in a charged capacitor

- Dielectric substances and their polarization
- Capacitor with dielectric
- Van-De-Graff - Generator

Unit-3

Current Electricity

- Electric Current and Current Density
- Ohm's Law and its limitations
- Electrical Resistivity and Conductivity
- Drift Velocity and Mobility and its relation with current
- Temperature Dependence of Resistivity
- Classification of materials on the basis of resistivity
- Colour Code for Carbon Resistors
- Super conductivity
- Electomotive force and Terminal Voltage of a cell
- Secondary Cell : Lead Accumulator
- Kirchhoff's Law and their Applications
- Combination of Resistors
- Combination of Cells
- Wheatstone Bridge and Metre Bridge
- Potentiometer, its Principle and application
- Electric Energy and Electric Power
- Joule's Law and its Practical Applications

Unit-4

Magnitic Effect of Electric Current

- Oersted's Observation
- Biot - Savart's Law and its Application
- Ampere's Circutical Law and its Application
- Force on a Current Carrying wire placed in a Magnetic Field and its Application
- Force on an electric charge moving in a Magnetic field and Lorentz force.
- Cyclotron
- Torque Acting on a Rectangular current carrying Coil kept in Uniform Magnetic field.
- Galvanometer, Voltmeter, Ammeter.

Unit-5

Magnetism & Matter

- Bar Magnet
- Current Loop as a Magnet and its Magnetic Moment.

- Magnetic moment of an electron rotating around the nucleus of an atom.
- Equivalence between a Bar magnet and a solenoid.
- Torque Acting on a magnetic dipole (Bar Magnet) in a Uniform Magnetic field.
- Guass's law for Magnetic field
- Magnetism of Earth and Magnetic elements
- Magnetization and Magnetic Intensity.
- Magnetic Properties of Materials: Dia, Para and Ferro magnetism and Hysterisis

  Permanent Magnets and Electromagnets

Unit-6

Electromagnetic Induction

- Faraday's Experiments
- Magnetic Flux
- Lenz's Law
- Faraday's Law
- Motional Emf
- Eddy Current and its Application
- Self Induction
- Mutual Induction
- A. C. Generator

Unit-7

Alternating Current

- L-C-R Series Circuit, its diffenrential equation and slution
- Different cases of A.C. Circuit
- r-m-s values of voltage and current.
- Series Resonance and Q factor
- Phasor Method and its Applications
- L.C. Osillations
- Power and Energy Associated with L,C and in an A.C. Circuit.
- Transformer

Unit-8

Electro Magnetic Waves

- Displacement Current
- Transverse nature of Electromagnetic Waves

- Characteristics of Electromagnetic Waves
- Electromagnetic Spectrum and Primary facts of its Applications

Unit-9

Ray Optics

- Reflection by Spherical Mirrror
- Relation between focal length and Radius of curvature
- Spherical Mirror formula
- Lateral Magnification
- Refraction of Light
- Lateral Shift
- Total Internal Reflection and Applicatios
- Refraction at a spherical curved surface.
- Spherical Lenses, Thin Lens LensMakers formula, Newton's formula
- Lateral Magnification of lens and Power of lens
- Combination of Thin Lens in contact
- Combination of Lens and Mirror
- Refraction and Dispersion of Light due to Prism
- Scattering of Light & Types
- Optical Instrument (Simple Microscope, Compound Microscope, Astronomical
- Telescope.)
- Human Eye and defects of vision

Unit-10

Wave optics

- Wave front and Huygen's Principle.
- Reflection and Refraction of Light through the concept of wavefront
- Superposition Principle Interference and Young's experiment.
- Diffraction and Diffraction due to single slit.
- Comparison between Diffraction and interference
- Resolving Power of Optical Instrument (Telescope, Microscope)
- Polarization, Plane polarized Light, Brewster's Law and Uses of Polarization.
- Polaroid, Malu's Law Nicol Prism.

Unit-11

Dual Nature of Rediation and Matter

- Black body Radiation
- Plank's Hypothesis for Radiation
- Photo electric effect
- Hertz's experiment
- Lenard's experiment
- Einstein's explanation for Photo electric effect
- Particle Nature of Light
- Photo cell and its uses
- Mater Waves - Wave nature of particles
- Davission Germer Experiment

Unit-1

Atom

- Thomson's Plum Pudding Model
- Rutherford's Experiment of Alpha Particles and his atomic Model, its limitation
- Atomic Spectra
- Bohr's Atomic Model, its success and limitation & Hydrogen Spectra
- Energy level and Hydrogen Spectra
- Quantization of Energy and Momentum
- Excitation and Ionization potential
- Emission and Absorption Spectra
- X-rays its Spectrum & Explaination

Unit-13

nucleus

- Atomic Mass and Constitution of Nucleus
- Nuclear Radius, Nuclear Stability, Nuclear Forces
- Mass-Energy relationship and Nuclear Binding Energy
- Natural Radioactivity
- Radio active Radiations
- Radio active Constant and Activity
- Exponential Law of Radioactive Disintegration
- Half Life & Mean Life

- $\alpha - decay$ $\beta - decay$ $\Upsilon - decay$
- Nuclear Fission, Nuclear Fusion and Nuclear Reaction

Unit-14

Semi Conductor Electronics

- Conductors, Insulators and Semiconductors (Bond Picture and Band Picture)
- N and P Types Semiconductors.
- P-N Junction diode
- Static Characteristics of P-N junction diode
- P-N junction diode as a Rectifier
- Special Types of PN junction - Zener diode, LED, Photo diode, Solar Cell.
- Transistor, its working, characteristic of a transistor, as an Amplifier
- Transistor as a Switch
- Transistor as an Oscillator
- Digital Electronics and Logic Circuits (AND, OR, NOT, NAND and NOR Gates)

  Primary Concept of IC

Unit-15

communication system

- Communication System (Transmitter Channel, Receiver, Noise)
- Signals and Bandwidth
- Modulation and its necessity]
- Modulation and its types
- Amplitude Modulation
- Frequency Spectrum of AM Wave
- Production of AM Wave
- Demodulation
- Propagation of Electromagnetic Waves (Ground Wave, Sky Wave & Space Wave)